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A New Species of *Gollania* (*Hypnaceae*, *Musci*) from Taiwan

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Gollania flagellata Higuchi, sp. nov. (*Hypnaceae*) is described from Taiwan. The most important diagnostic characters of this species are: (1) distinct stepwise layered stems by annual growth, (2) stem leaves with longer costae and long-decurrent bases, (3) cylindrical capsules, (4) exostome teeth with blunt apical parts and (5) endostome with fragile segments and rudimentary cilia.

Key words: *Gollania flagellata*, Hypnaceae, new species, Taiwan.

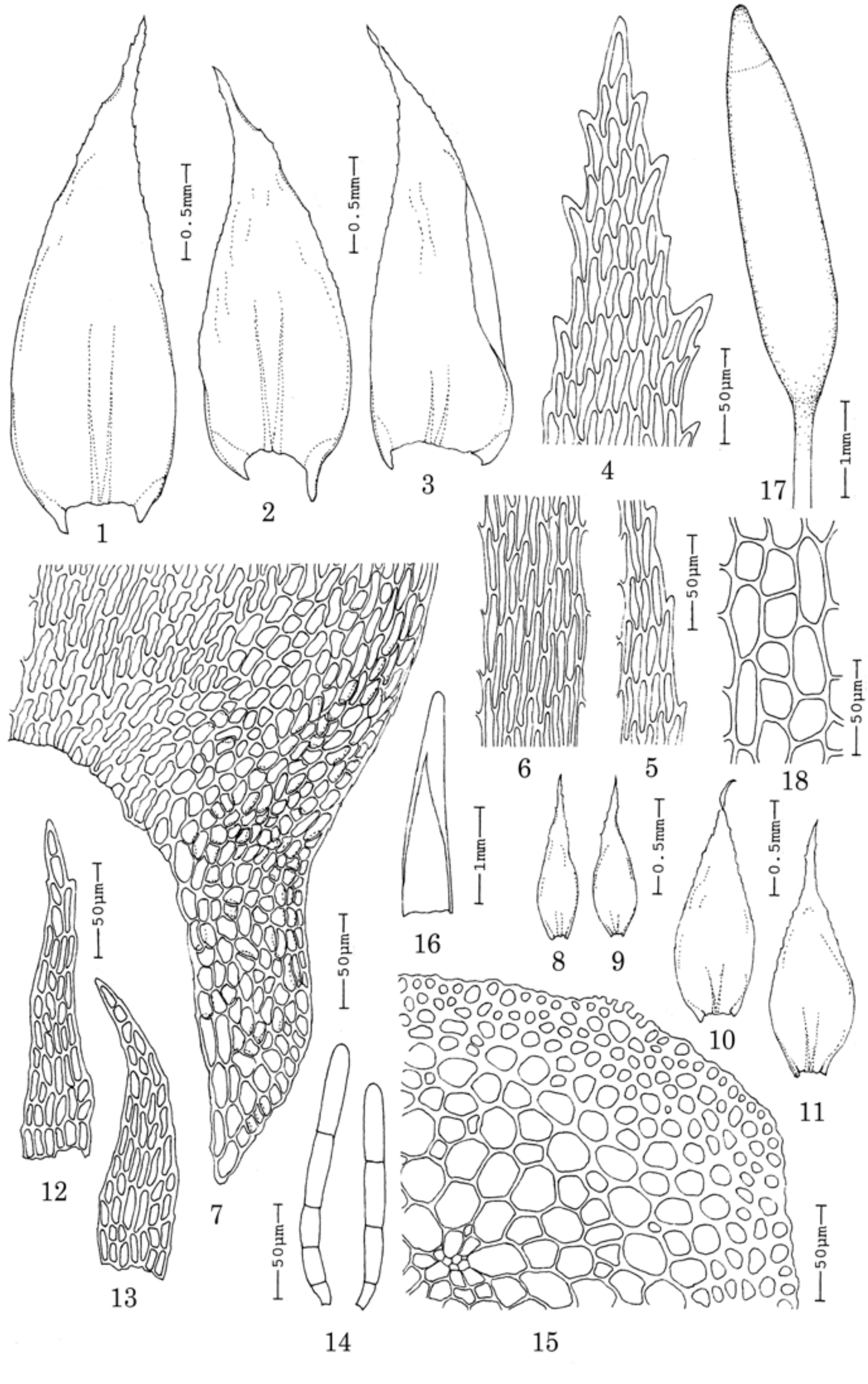
The genus *Gollania* is a pleurocarpous moss of 20 species distributed in mainly temperate regions of East Asia (Higuchi 1985, 2001, Higuchi and Wu 1995, Higuchi and Long 1996). In the course of a study on the Taiwanese moss collection made by the author in 2004 and 2010, I encountered the specimens of *Gollania* which proved to be an undescribed species. I describe it here as a new species.

Gollania flagellata Higuchi, sp. nov.
[Figs. 1–26]

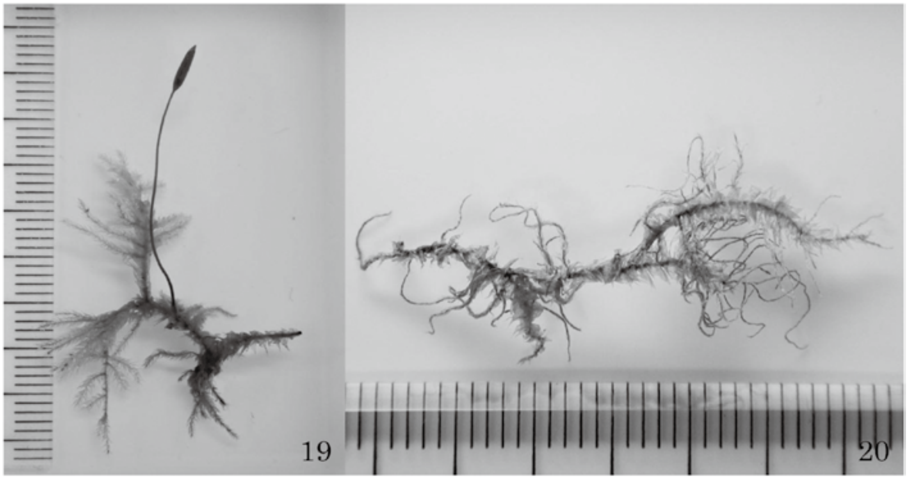
Planta affinis *Gollaniae cylindricarpae* (Mitt.) Broth., sed differt 1) foliis caulinibus complanatis vel subjulaceis, 2) foliis alaribus late et longe decurrentibus, 3) capsulis erectis cylindricis longioribus et 4) ciliis rudimentaribus.

Type: TAIWAN. Taichung County, between Mt. Duojiatun and Yuleng Cabin, en route from Shiyuan Yakou to Mt. Nanhu, 2600 m, growing on tree-trunk in forest, 30 September 2010, M. Higuchi 50301 (holotype in TNS; isotype in TUNG).

Dioicous. Plants medium-sized for the genus, yellowish-green, somewhat glossy. Stems prostrate, up to 6 cm long, usually stepwise layered because of repeated annual growth, pinnately or sometimes bi-pinnately branched, elliptical in cross-section, with a slightly differentiated central strand; leafy stems complanate to subjulaceous, with divergent leaves; branches subjulaceous, irregular in length, sometimes flagelliform, up to 3 cm long. Pseudoparaphyllia lanceolate. Axillary hairs 3–5 cells with a shorter basal cell. Dorsal, lateral and ventral stem leaves slightly differentiated. Dorsal stem leaves straight or weakly falcate, ovate-lanceolate, gradually narrowed to a slender apical part, subcordate at base, widely long-decurrent, 2.2–2.8 × 0.8–1.0 mm; margins irregularly serrate above, subentire below, recurved at base; costae double, long, ca. 1/3–1/2 the leaf length, usually united at base; median laminal cells linear, weakly flexuose, 28–50 × 3–4 μm in lumen, thick-walled, smooth; upper laminal cells rarely prorate at upper ends on dorsal side; basal laminal cells larger and thicker-walled than median cells, porose; alar cells well-



Figs. 1–18. *Gollania flagellata* Higuchi. 1. Dorsal stem leaf. 2. Lateral stem leaf. 3. Ventral stem leaf. 4–7. Laminal cells of stem leaf (4: apical part, 5: median marginal part, 6: median central part, 7: alar part). 8, 9. Leaves of secondary branch. 10, 11. Branch leaves. 12, 13. Pseudoparaphyllia. 14. Axillary hairs. 15. Part of transverse section of stem. 16. Calyptra. 17. Capsule. 18. Median exothecial cells. All drawn from holotype.



Figs. 19, 20. *Gollania flagellata* Higuchi. 19. Plant with a sporophyte in wet. 20. Plant showing flagelliform branches in dry. Scales for 19 and 20 in 1 mm. (19 taken from the holotype; 20 from Higuchi 43851, TNS).

differentiated, subquadrate to rectangular, similar to cells of decurrent parts. Lateral and ventral stem leaves similar to dorsal ones, but ventral ones with shorter costae. Branch leaves smaller, 1.2–1.4 × 0.4–0.5 mm; costa distinct, ca. 1/3 the leaf length. Inner perichaetial leaves reflexed at upper slender parts, ecostate; laminal cells thick-walled. Calyptrae cucullate.

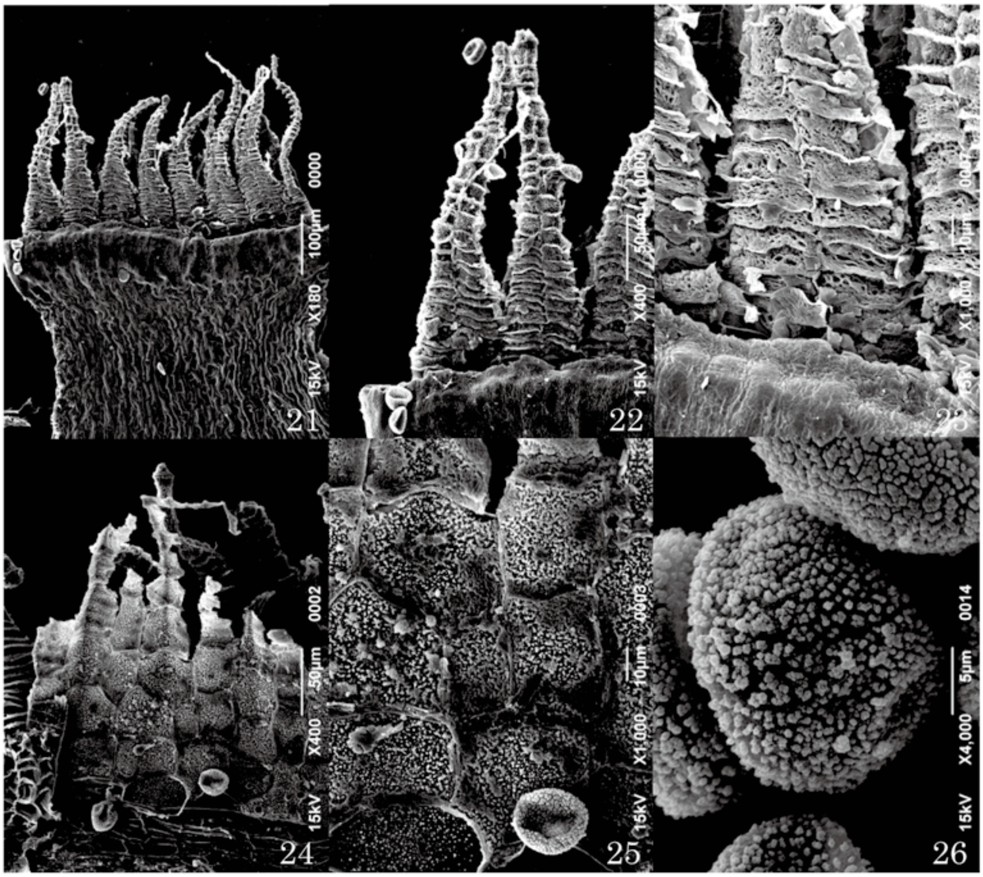
Setae 2.0–2.9 cm long. Capsules erect, cylindrical, straight, 4.0–5.8 mm long (excl. opercula), 0.8–1.2 mm wide; exothecial cells elongate rectangular to subquadrate, 20–46 × 12–24 μm in lumen, thick-walled; opercula conic. Exostome teeth lanceolate, with blunt apical parts, papillose above, transversely smooth-striolate below on the external surface, papillose and with projecting trabecular on the internal surface. Endostome with a densely papillose basal membrane ca. 1/3 as high as exostome teeth, fragile segments keeled and cilia rudimentary. Spores 20–30 μm in diameter, finely papillose.

Additional specimen examined: Taiwan. Hualien County, peak of Mt. Chingshui, 2400 m, growing on boulder in forest, 4 Sept. 2004, M. Higuchi 43851 (TNS).

Distribution: Endemic to Taiwan.

This species is characterized by (1) distinct stepwise layered stems by annual growth (Figs. 19, 20), (2) stem leaves with longer costae (Figs. 1, 2) and long-decurrent bases (Fig. 7), (3) cylindrical capsules (Figs. 17, 19), (4) exostome teeth with blunt apical parts (Fig. 22) and (5) endostome with fragile segments and rudimentary cilia (Fig. 24). There is no difficulty in distinguishing this species from the other species of the genus when it has flagelliform branches (Fig. 20).

This species is closely related to *Gollania cylindricarpa* (Mitt.) Broth. known from Nepal, Bhutan, continental China (Yunnan) and Taiwan. They have in common stem leaves with long costae and long-decurrent bases and cylindrical capsules. *Gollania cylindricarpa* is distinguished from *G. flagellata* by its julaceous leafy stems, stem leaves with narrower decurrent bases, shorter and suberect capsules (2.5–3.0 mm long) and endostome with stout segments and 1–2 cilia. *Macrothamnium leptohymenioides* Nog., known from Nepal, India (Sikkim), Bhutan, Myanmar and China (Tibet, Yunnan), is similar to *G. flagellata* by its erect capsules and decurrent leaf bases. However, *M.*



Figs. 21–26. SEM micrographs of peristome and spores of *Gollania flagellata* Higuchi. 21. Outer view of peristome. 22. Outer surface of exostome teeth. 23. Outer surface at lower part of exostome teeth. 24. Inner view of peristome. 25. Part of basal membrane. 26. Spores. All taken from the holotype.

leptohymenioides is distinct from *G. flagellata* by its widely ovate stem leaves with shorter costae and prorate laminal cells, leaf margins with sharp spinous teeth, oblong capsules (1.2–1.6 mm long) and endostome without cilia.

Thus, totally eight species of the genus occur in Taiwan, and *G. arisanensis* Sakurai and the present new species are endemic to Taiwan. The following key is revised from Higuchi (1985).

Key to the species of *Gollania* in Taiwan

1. Dorsal, lateral and ventral stem leaves well-differentiated; leafy stems complanate,with second or squarrose leaves 2
1. Dorsal, lateral and ventral stem leaves not or slightly differentiated; leafy stems julaceous to subjulaceous, with divergent leaves................... 5
2. Alar cells well-differentiated, more than 8 in transverse row .... *G. robusta*
2. Alar cells weakly differentiated, less than 8 in transverse row 3
3. Leaf margins plane throughout; pseudoparaphyllia round-triangular; occurring on calcareous substrata .... *G. taxiphylloides*
3. Leaf margins recurved at bases; pseudoparaphyllia lanceolate; occurring on various kinds of substrata 4
4. Dorsal stem leaves usually less than 2 mm long: apical parts of stem leaves not rugose ....*G. arisanensis*
4. Dorsal stem leaves usually more than 2 mm

long; apical parts of stem leaves rugose ....*G. ruginosa*
5. Dorsal stem leaves suddenly narrowed to a short apical part 6
5. Dorsal stem leaves gradually narrowed to a long apical part 7
6. Leaf margins serrulate above; costae ca. 1/3 the leaf length; laminal cells of inner perichaetial leaves thin-walled ....*G. japonica*
6. Leaf margins subentire above; costae 1/5–1/4 the leaf length; laminal cells of inner perichaetial leaves thick-walled and porose ....*G. philippinensis*
7. Leafy stems julaceous; costae not united at base; leaf decurrent bases narrower; capsules shorter (2.5–3.0 mm long); cilia 1–2 ....*G. cylindricarpa*
7. Leafy stems complanate to subjulaceous; costae united at base; leaf decurrent bases wider; capsules longer (4.0–5.8 mm long); cilia rudimentary ....*G. flagellata*

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樋口正信：**台湾産ラッコゴケ属（ハイゴケ科，蘚類）の1新種**

ラッコゴケ属（ハイゴケ科）は東アジアを中心に分布する腋蘚類である．2004年と2010年の蘚類コレクションを研究中，ラッコゴケ属の新種が認められた．新種 *Gollania flagellata* は，(1) 明瞭な年次成長による階段状の茎，(2) 長い中肋と長く下延する基部をもつ茎葉，(3) 円筒形の蒴，(4) 先端部が鈍頭の外蒴歯，(5) もろい歯突起と痕跡的な間毛からなる内蒴歯などを持つ点で特徴づけられる．本種はネパール，ブータン，中国（雲南省），台湾にかけて分布する *G. cylindricarpa* (Mitt.) Broth. と長い中肋と長く下延する基部をもつ茎葉や円筒形の蒴などの共通点を持ち，近縁と考えられる．しかし，*G. cylindricarpa* は，葉をつけた茎は断面で丸くなり，中肋の基部は融合せず，葉の下延する基部はより狭く，蒴はより短く，丈夫な歯突起と1本または2本の間毛からなる内蒴歯を持つなどの点で本種と区別される．また，ネパール，インド（シッキム），ブータン，ミャンマー，中国（チベット，雲南省）にかけて分布する *Macrothamnium leptohymenioides* Nog. は，直立する蒴や長く下延する基部をもつ点で本種に似るが，幅広い卵形の茎葉，短い中肋，先端部に突起のある葉細胞，鋭い鋸歯のある葉縁部，短い蒴，間毛を欠く内蒴歯などを持つ点で本種と異なる．台湾産本属の8種の検索表を示した．本種と *G. arisanensis* Sakurai は台湾固有である．

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